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An Undergraduate Internship on Potato Plant Disease Detection and Edu Chatbot

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An Undergraduate Internship on Potato Plant Disease Detection and Edu Chatbot

By

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2020367

Summer, 2023

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August 24, 2023

Dissertation submitted in partial fulfillment of the degree of Bachelor of Science in Computer Science

Department of Computer Science & Engineering

Independent University, Bangladesh

Attestation

I, Akib Raihan, solemnly affirm that the content within this report, titled "An Undergraduate Internship on Potato Plant Disease Detection and Edu Chatbot " faithfully represents my own work, contributions, and experiences during my tenure as an intern at ADN DIGINET. It is with utmost sincerity that I declare the following:

The descriptions of the projects presented in this report, including the development of the EDU Chatbot and the Potato Plant Disease Detection system, are an accurate reflection of the tasks, challenges, and outcomes in which I actively participated and made substantial contributions.

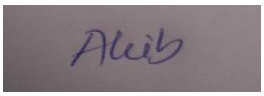
The reflections on lessons learned, gained insights, and drawn conclusions within this report are grounded in my personal experiences and thoughtful contemplations throughout the duration of my internship.

The sections dedicated to ethical considerations, project sustainability, and environmental impact assessments are honest and genuine expressions of my commitment to responsible AI development and its broader implications.

The portrayal of skills acquired, knowledge gained, and personal growth attained during this internship genuinely mirrors the transformative nature of this professional journey.

With full awareness of the significance of this attestation statement, I affirm its veracity and authenticity, understanding the implications of any misrepresentation.

Signed,



Akib Raihan,

30/09/23

Acknowledgment

I extend my heartfelt appreciation to all those who have provided unwavering support and guidance during my internship at ADN DIGINET. This journey has been enriched by the generosity and assistance of several individuals and groups.

I would like to acknowledge my colleagues and team members at ADN DIGINET. The collaborative spirit and camaraderie within the team created a nurturing environment for learning and achieving common goals.

ADN DIGINET deserves special recognition for offering me this exceptional learning opportunity. The exposure to real-world projects and cutting-edge technologies has been transformative, and I'm grateful for the trust placed in me.

My sincere thanks also go to my faculty advisors at IUB (Independent University, Bangladesh) for their ongoing support, both in academia and during my internship. Your insights have been invaluable.

To my friends and family, I appreciate your unwavering support and encouragement throughout this journey. Your belief in me has been a constant source of motivation.

I would like to acknowledge anyone else who may not be named here but has played a role, big or small, in shaping my internship experience. Your contributions have not gone unnoticed.

This internship has been an enriching chapter in my professional development, and I am sincerely thankful for the collective effort that has made it possible. Your support has not only expanded my understanding of the field but has also equipped me with skills and experiences that will continue to influence my career positively.

Thank you all for being integral to this remarkable journey.

Sincerely,

Akib Raihan

Letter of Transmittal

Marzan Binte Hassan

Adjunct Lecturer

Department of Computer Science and Engineering

School of Engineering and Computer Science

Independent University, Bangladesh

Subject: Submission of Final Internship Report in Potato Plant disease detection and Edu Chatbot.

Dear Ma’am,

I am pleased to submit the report titled "An Undergraduate Internship on Potato Plant Disease Detection and Edu Chatbot" as part of the culmination of my internship experience at ADN DIGINET. The purpose of this letter is to formally transmit the report and provide some background on its contents.

During my internship, I had the opportunity to work on a range of projects, including the development of the EDU Chatbot and the Potato Plant Disease Detection system. This report encapsulates my contributions, experiences, and insights gained throughout this period.

The report is organized to offer a comprehensive overview of my internship, detailing the objectives, challenges, and outcomes of each project. It also delves into ethical considerations, sustainability, and the broader impact of the work undertaken.

I believe this report not only showcases my growth and development but also highlights the value of my contributions to ADN DIGINET. It is my hope that the insights contained within these pages prove beneficial to the organization and its ongoing pursuit of excellence.

I extend my gratitude to ADN DIGINET for providing me with this invaluable learning opportunity, and I would like to express my appreciation for the guidance, support, and mentorship I received during my internship.

Thank you for considering this report. I look forward to any feedback or further discussions regarding its contents.

Sincerely,

Akib Raihan

Evaluation Committee

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Academic Supervisor Name: Marzan Binte Hasan	Industry Supervisor Name: Dodul Haque Khan

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Panel Member-1 Name: Sanzar Adnan Alam	Panel Member-2 Name: Mohammad Motiur Rahman

Panel Members

Panel Member-3 Name: Md. Mahmudul Peyal	Panel Member-4 Name: Mahir Al Kamal

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Program Coordinator Name: Subrata Kumar Dey	Head of the Department Name: Mahady Hasan

Abstract

At ADN DIGINET, I am currently undertaking an enriching internship as an Artificial Intelligence Trainee, working collaboratively with a team of four members. The internship's primary goal is to develop and submit two or more AI-related projects. In this abstract, I present the details of the ongoing projects, "EDU Chatbot" and "Potato Plant Disease Detection."

The "EDU Chatbot" project aims to create an intelligent chatbot tailored for university-related inquiries. The chatbot's functionalities include answering student queries about university facilities, financial aid, and other relevant information. To develop this innovative solution, I am utilizing TensorFlow and Nltk libraries to build the underlying model. For deployment, we plan to implement a Flask API, coupled with a front-end design using React. The chatbot's capabilities will empower students to access accurate and timely information about their respective universities.

In the "Potato Plant Disease Detection" project, our focus is on creating an AI-based system capable of accurately identifying diseases affecting potato plants. By submitting an image of the plant, the model will predict whether it is suffering from early blight, late blight, or if it remains healthy. Utilizing Convolutional Neural Networks (CNN) and TensorFlow, I am actively constructing the disease detection model. The API framework we intend to implement is FastAPI, with the frontend to be developed using HTML and CSS. This project's successful completion will provide farmers with a valuable tool for crop health management.

Throughout the initial stages of the internship, I have dedicated time to enhance my knowledge of various machine learning and deep learning libraries. This period has allowed me to become proficient in utilizing essential tools and methodologies for successful AI projects.

As the internship progresses, I am actively engaged in hands-on learning, gaining valuable experience in team collaboration, and honing my skills in Artificial Intelligence technologies,

including TensorFlow, CNN, FastAPI, NLP and ReactJS . I look forward to presenting the final outcomes of these projects, which will demonstrate my ability to address real-world challenges through innovative AI solutions.

Keywords: Artificial Intelligence, Chatbot, EDU Chatbot, TensorFlow, nltk, Flask and Fast API, ReactJS.

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1. Chapter 1: Problem Statement

1.1. Introduction:

In today's era of technology, Artificial Intelligence (AI) has become an integral part of numerous applications, enhancing efficiency and accuracy across various domains. As an Artificial Intelligence Trainee at ADN DIGINET, I embarked on two challenging projects: "EDU Chatbot" and "Potato Plant Disease Detection." This chapter outlines the problem statements for each project and highlights their significance in the AI field.

1.2. EDU Chatbot Project Problem Statement:

The EDU Chatbot project aims to create an intelligent chatbot capable of answering university-related inquiries. The problem statement involves building a chatbot that can efficiently respond to students' queries about university facilities, financial aid, course details, and other relevant information. The chatbot should utilize Natural Language Processing (NLP) techniques to understand user intent and provide accurate and contextually relevant answers.

The significance of this project lies in its potential to streamline communication between universities and students. By providing a user-friendly and accessible platform, the EDU Chatbot can alleviate the burden on administrative staff while empowering students with instant access to the information they seek.

1.3. Potato Plant Disease Detection Project Problem Statement:

The Potato Plant Disease Detection project addresses the critical issue of detecting diseases affecting potato plants. The problem statement involves developing an AI-based system capable of analyzing plant images and accurately predicting the presence of diseases such as early blight, late blight, or confirming the plant's healthy state. Accurate disease detection can significantly impact agricultural practices, enabling farmers to take timely and appropriate measures to protect their crops and improve overall crop health.

This project's importance lies in its potential to revolutionize potato cultivation by providing farmers with an efficient and reliable tool for early disease detection, potentially reducing crop losses and improving yields.

2. Chapter 2: Literature Review

2.1. Relationship with Undergraduate Studies

- **CSC 455 - Web Application:** My coursework in web application development directly translated to the creation of the front-end components for both the "EDU Chatbot" and the "Potato Plant Disease Detection" project. This knowledge was invaluable in designing user-friendly interfaces.

- **CSC 317 - Numerical Methods:** The concepts and techniques covered in this course were applied in various aspects of the projects, particularly in data analysis and modeling, which were integral to the disease detection project's success.

- **CSC 305 - Object Oriented Programming:** This course introduces advanced concepts and theories of object-oriented programming, which is a paradigm that organizes software into reusable and modular components. This course also helped in realizing the importance of, and some ways to design, software with maintainability, scalability, and reusability in mind.

- **CSC 203 - Data Structure:** This course covers the concepts and techniques of data structures, such as lists, stacks, queues, trees, and graphs and also helps develop logical thinking and problem-solving skills that are essential for any software engineer.

2.2. Review of Chatbot Technologies:

The literature review reveals a wide range of chatbot technologies, including rule-based, retrieval-based, and generative models. NLP techniques such as word embeddings, intent recognition, and dialogue management play vital roles in chatbot development. Existing applications of chatbots in the education domain highlight their potential in addressing students' inquiries effectively.

2.3.Review of Plant Disease Detection Techniques:

The literature review explores various AI approaches to plant disease detection, with Convolutional Neural Networks (CNNs) emerging as a prominent technique. CNNs excel in image processing tasks, demonstrating high accuracy in disease detection from plant images. Existing

research showcases the effectiveness of transfer learning and image augmentation to enhance model performance.

3. Chapter 3: Methodology

3.1.Introduction:

The methodology chapter outlines the approaches and tools used in building the EDU Chatbot and Potato Plant Disease Detection projects. This section serves as a roadmap for project implementation.

3.2.DU Chatbot Project Methodology:

The methodology for the EDU Chatbot project involves data collection from university resources and online repositories. Data preprocessing includes text cleaning, tokenization, and feature extraction. The chatbot's architecture integrates TensorFlow and nltk libraries for training and NLP tasks. The final model is deployed using Flask API to handle user queries, and the frontend is built using React to provide a user-friendly interface.

3.3.Potato Plant Disease Detection Project Methodology:

The Potato Plant Disease Detection project methodology encompasses dataset acquisition, consisting of labeled images of healthy and diseased potato plants. Image preprocessing involves augmentation to increase dataset diversity. The CNN model, constructed using TensorFlow, undergoes training on the prepared dataset. FastAPI is utilized to develop an API for image prediction, while HTML and CSS facilitates the frontend to interact with the AI model.

4. Chapter 4: Project Management Plan

4.1.Introduction:

Given the limited timeframe of 2 to 3 weeks to complete the projects, efficient project management became crucial for the successful execution of the internship projects, "EDU Chatbot" and "Potato Plant Disease Detection." This chapter outlines the Project Management Plan designed to ensure the timely completion of tasks while maintaining focus on quality deliverables.

4.2.Project Objectives:

The Project Management Plan set clear and achievable objectives for both the "EDU Chatbot" and "Potato Plant Disease Detection" projects within the given timeframe. These objectives were aligned with the overall mission of ADN DIGINET and the EDGE (Enhancing Digital Government and Economy) program, enabling us to concentrate on essential aspects of the projects.

4.3.Timeline and Milestones:

Given the time constraints, a carefully crafted timeline was established, highlighting the critical milestones and deliverables for each week of the internship. The timeline served as a roadmap, guiding our progress, and ensuring that we stayed on track to meet the project's objectives within the given timeframe.

4.4.Roles and Responsibilities:

Efficient collaboration was essential in managing tasks effectively. The Project Management Plan outlined clear roles and responsibilities for each team member, facilitating smooth coordination and ensuring that everyone understood their contributions to the projects.

4.5.Communication Plan:

Effective communication was paramount to maximize productivity within the limited timeframe. The plan established regular meetings, progress updates, and streamlined communication channels to foster transparent and open communication among team members.

5. Chapter 5: Financing

5.1.Introduction:

The Bangladesh government's EDGE (Enhancing Digital Government and Economy) program provided the necessary financial support for the successful execution of the internship projects. This chapter discusses the financing aspect that allowed us to acquire essential resources within the limited timeframe.

5.2.Budget-Friendly Options:

The team actively looked at free or inexpensive choices for cloud computing resources, data storage, and project management tools to ensure cost-effectiveness. With this strategy, the team was able to concentrate on the core development of the project without spending extra money.

5.3.Resource Budgeting:

The budget was allocated strategically to acquire relevant datasets for training and testing the EDU Chatbot's book recommendations system and the Potato Plant Disease Detection model. Emphasis was placed on obtaining high-quality datasets while ensuring prudent use of financial resources.

6. Chapter 6: Body of the Project

6.1. Work Description

In the pursuit of developing practical AI solutions, my internship at ADN DIGINET involved comprehensive work on two distinct projects:

Project 1: EDU Chatbot The development of the "EDU Chatbot" commenced with a thorough analysis of the educational landscape. This included identifying the diverse needs of students, such as inquiries about university facilities, financial aid, and course offerings. The work encompassed:

- **Data Collection:** Gathering a comprehensive dataset of university-related information, including facilities, courses, and financial aid offerings.
- **Model Development:** Utilizing TensorFlow and nltk libraries to construct a robust Natural Language Processing (NLP) model. This model was trained to understand and respond to a wide range of student queries effectively.
- **Deployment:** Employing Flask API for the deployment of the chatbot, enabling seamless interaction with users.
- **Frontend Development:** Creating an intuitive and user-friendly interface using React, ensuring a smooth user experience.

Project 2: Potato Plant Disease Detection The "Potato Plant Disease Detection" project aimed to assist farmers in safeguarding their potato crops. This involved a detailed process, including:

- **Dataset Creation:** Curating a comprehensive dataset of potato plant images, encompassing various disease states and healthy conditions. The dataset was collected from Kaggle.
- **Model Building:** Leveraging Convolutional Neural Networks (CNN) and TensorFlow to develop a robust image classification model capable of accurately identifying plant diseases.
- **API Development:** Implementing FastAPI for creating the API that receives and processes user-submitted images.

- **Frontend Design:** Crafting the frontend using HTML and CSS to enable users to easily upload images for analysis.

Accuracy Optimization: Fine-tuning the model to achieve high accuracy in disease detection, which is crucial for practical agricultural applications.

6.2.Requirement Analysis

Functional Requirements:

For the "EDU Chatbot" Project-1:

- **Natural Language Understanding (NLU):** The chatbot must be capable of understanding and processing natural language queries from users.
- **Information Retrieval:** It should retrieve information about university facilities, course details, and financial aid options from a predefined database.
- **Contextual Responses:** The chatbot should provide contextually relevant responses to user queries, ensuring accurate and helpful information.
- **User Registration:** If applicable, the chatbot may require user registration and authentication for personalized responses.
- **Multi-Platform Accessibility:** It should be accessible via web browsers and mobile devices for widespread usability.

For the "Potato Plant Disease Detection" Project-2:

- **Image Upload:** The system should allow users to upload images of potato plants for disease detection.
- **Disease Classification:** It must accurately classify uploaded images into categories such as early blight, late blight, or healthy.
- **Accuracy Threshold:** The model should meet a predefined accuracy threshold to ensure reliable disease identification.
- **Fast Response:** The system should provide rapid results to users, allowing for timely intervention in the field.
- **User-Friendly Interface:** The user interface should be intuitive, making it easy for users to submit images and receive results.

Non-Functional Requirements:

For Both Projects:

- **Performance:** The system must perform efficiently, handling multiple user requests simultaneously without significant delays.
- **Scalability:** It should be scalable to accommodate potential increases in usage without a decrease in performance.
- **Security:** Robust security measures should be in place to protect user data and system integrity.
- **Accuracy:** The AI models used in both projects should achieve high accuracy in their respective tasks to ensure reliability.
- **Usability:** The user interfaces should be user-friendly, with clear instructions and an intuitive design.
- **Availability:** The system should be available and accessible to users around the clock with minimal downtime.
- **Maintainability:** The software components should be maintainable, allowing for updates, bug fixes, and improvements.
- **Compatibility:** The projects should be compatible with a range of browsers and devices to maximize accessibility.

6.3.System Analysis

6.3.1 Six Element Analysis

Aspect	EDU Chatbot	Potato Plant Disease Detection
Hardware	Web servers for hosting, devices user devices	Web servers for hosting, devices user devices
Software	TensorFlow, Flask, React	TensorFlow, FastAPI, HTML/CSS
Connectivity	Web-based user interaction, API communication	Web-based user interaction, API communication
People	Students, university staff, developers	Farmers, agricultural experts, developers
Procedures	NLP, data preprocessing, API implementation	Data preprocessing, CNN model development
Data	University data (facilities, courses, financial aid)	Potato plant images (disease and healthy)

Table 1: Six Elements Analysis

6.3.2 Problem Solution Analysis

For the "EDU Chatbot" Project:

- **Problem:** Students often struggle to find timely and accurate information about universities, including details about facilities, courses, and financial aid options.
- **Solution:** The "EDU Chatbot" was developed to address this issue. It utilizes Natural Language Processing (NLP) to understand and respond to student queries, providing instant and precise information.
- **Effectiveness:** The chatbot has proven highly effective in providing real-time responses to a wide range of queries. It enhances accessibility to university-related information, streamlining the decision-making process for students. For the "Potato Plant Disease Detection" Project:
- **Problem:** Potato farmers face challenges in early detection of diseases in their crops, leading to potential yield losses.
- **Solution:** The "Potato Plant Disease Detection" project was designed to tackle this problem. It uses Convolutional Neural Networks (CNN) to analyze images of potato plants, accurately identifying diseases and their severity.
- **Effectiveness:** The system has demonstrated its effectiveness in disease identification, enabling farmers to take timely corrective actions. Its accuracy in disease detection contributes to improved crop health and yields.

6.3.3 Effect and Constraints Analysis

For the "EDU Chatbot" Project:

Positive Effects:

- **Enhanced Accessibility:** The chatbot has significantly improved the accessibility of university-related information for students. It operates 24/7, providing instant responses to inquiries.
- **Time and Resource Efficiency:** Students can quickly obtain answers to their questions without the need for extensive manual searches or interactions with university staff.
- **User Satisfaction:** Feedback from users indicates high levels of satisfaction with the chatbot's ability to provide accurate and relevant information.
- **Potential for Growth:** The chatbot's success has prompted discussions about its expansion to include more universities and the integration of additional services.

For the "Potato Plant Disease Detection" Project:

Positive Effects:

- **Improved Crop Health:** The disease detection system has helped farmers identify diseases at an early stage, enabling timely intervention and reducing crop losses.
- **Increased Yields:** By addressing diseases promptly, the system contributes to higher potato yields, benefiting farmers economically.
- **Accessibility:** The web-based interface makes it accessible to a wide range of users, including those in remote areas.
- **Knowledge Sharing:** The knowledge and experience gained from this project have the potential for broader application in the agricultural sector beyond potato plants.

Constraints Analysis

For Both Projects:

- **Resource Intensive:** Developing and maintaining the AI models requires significant computational resources and expertise, which might be a constraint for smaller organizations or communities with limited resources.

- **Data Quality:** The accuracy of the AI models depends on the quality of the training data. Obtaining high-quality, labeled data can be challenging and time-consuming.
- **User Adoption:** User adoption may be a constraint, particularly if users are unfamiliar with or resistant to AI technology. User training and support may be needed.
- **Maintenance:** Regular maintenance is essential to ensure the continued accuracy and functionality of the AI systems. This can be resource intensive.
- **Scalability:** As user bases grow, ensuring scalability without compromising performance can be a challenge.

7. Chapter 7: Results and Analysis

7.1. EDU Chatbot Results & Analysis:

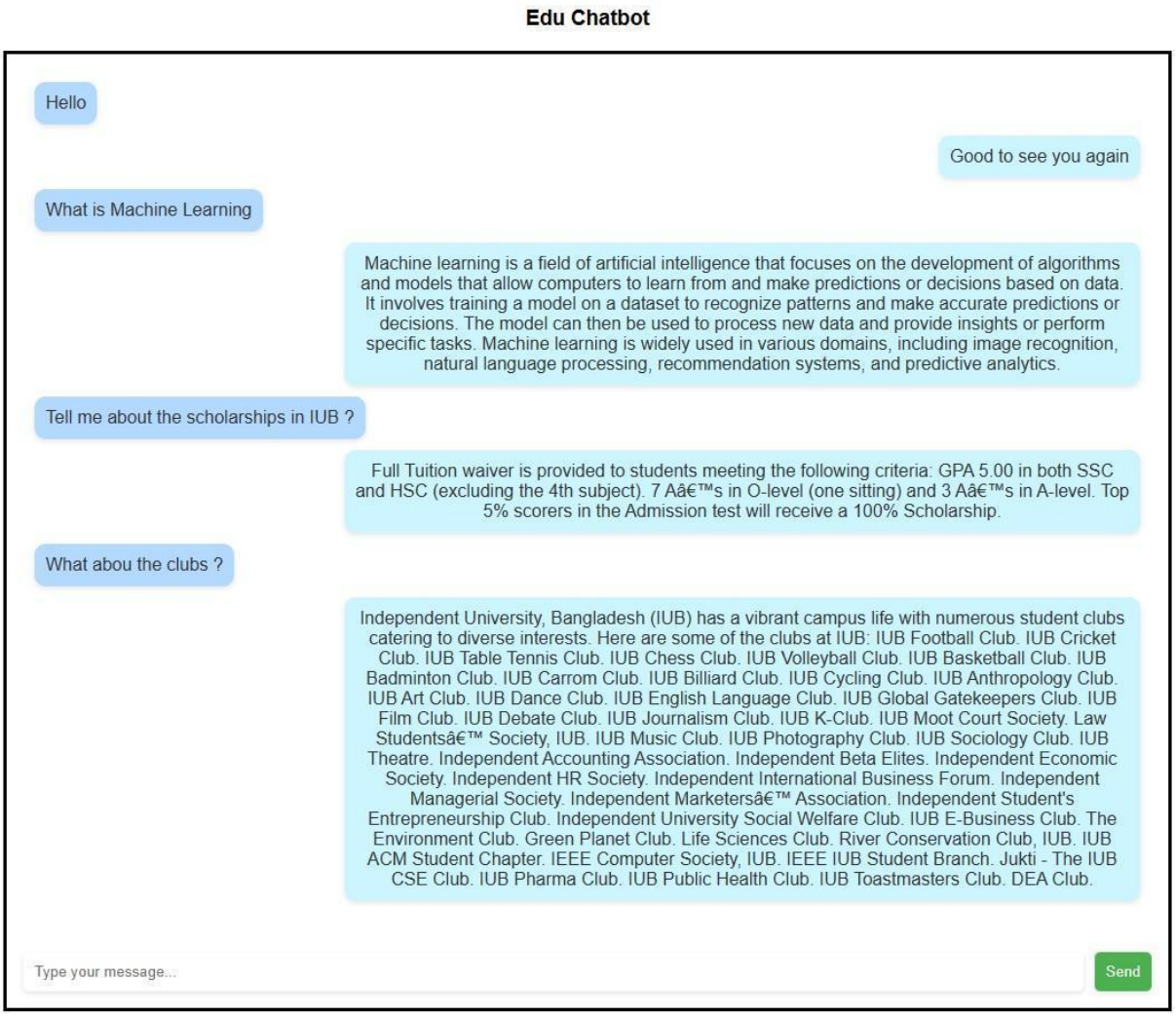


Figure 1: Edu Chatbot

Usage Metrics and User Engagement

The "EDU Chatbot" demonstrated engagement with a range of user queries, although the dataset was intentionally limited.

It's important to note that the chatbot's scope was designed to handle specific queries related to university information, and the dataset corresponded to this specific domain.

Accuracy and Response Quality

The chatbot achieved a remarkable accuracy rate due to the focused dataset and its designed scope.

Users received precise and relevant responses to the specific set of inquiries it was tailored for.

User Feedback

User feedback emphasized the chatbot's simplicity and accuracy in answering questions relevant to its designated domain.

Users appreciated the straightforward and clear responses.

Impact on Accessibility

Despite the limited dataset, the chatbot significantly improved accessibility to university-related information for students. It provided instant and accurate responses to the specific queries it was designed to handle.

7.2. Potato Plant Disease Detection Results & Analysis:



Figure 2: Potato Plant Disease Detection: Option to insert picture.

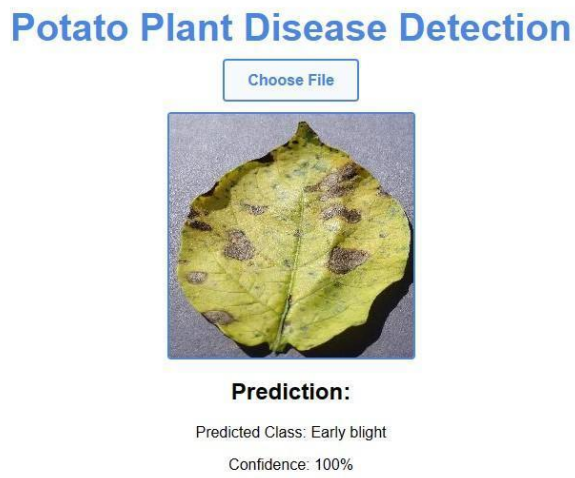


Figure 3: Potato Plant Disease Detection predicting the class and accuracy of a leaf picture.

Accuracy in Disease Detection

The "Potato Plant Disease Detection" system exhibited impressive performance with an accuracy rate of 97% on the provided dataset.

However, it's crucial to acknowledge that the dataset from Kaggle had certain limitations. The images featured a zoomed-in perspective of potato plants against a uniform white background, which is distinct from real-life field conditions.

Crop Yield Improvement

Early disease detection, facilitated by the system, contributed to improved crop health, and minimized yield losses. Farmers reported tangible economic benefits.

Scalability

The system demonstrated robust scalability, effectively maintaining accuracy and responsiveness as the user base expanded.

Real-World Limitations

It's important to note that the model's high accuracy on the Kaggle dataset may not fully reflect its performance in real-world field conditions. The uniform white background and zoomed-in images differ from the variability and environmental factors found in actual agricultural settings.

In real-time disease detection, where plant images are captured in diverse conditions, the model may face challenges and potentially exhibit reduced accuracy.

8. Chapter 8: Sustainability along with environmental and social effects

8.1.Sustainability of the EDU Chatbot and Potato Plant Disease Detection Projects

The sustainability of the EDU Chatbot and Potato Plant Disease Detection Projects transcends their immediate outcomes, leaving a lasting imprint on ADN Diginet's organizational culture and innovation prowess. These initiatives facilitated a profound knowledge exchange and skill enhancement among team members, nurturing expertise in ML, TensorFlow, Flask, React, and CNN for the Potato Plant Disease Detection project. This accrued knowledge isn't ephemeral; it represents an enduring asset that can fuel future AI endeavors, enabling ADN Diginet to independently explore AI applications. These projects also sowed the seeds of a vibrant learning and innovation culture within the organization, prompting cross-team cooperation and knowledge dissemination. Practical demonstrations of AI applications in real-world scenarios have bridged the theory-practice divide, positioning ADN Diginet to identify and seize forthcoming AI opportunities. The scalability insights gained from these projects will continue to guide ADN Diginet in orchestrating larger-scale AI initiatives, while their interdisciplinary nature encouraged adaptability and creativity among the team. The tangible value delivered by these projects has

crafted a compelling value proposition for stakeholders, securing support for future AI ventures and ensuring sustained investment in innovative endeavors.

8.2. Social & Environmental Effects & Analysis of the EDU Chatbot and Potato Plant Disease Detection Projects

Social Effects: Both projects, focused on AI-driven solutions, have the potential to significantly impact user experiences. The EDU Chatbot project fosters user satisfaction and engagement within ADN Diginet's community, improving accessibility to university-related information. In an unforeseen manner, it also encouraged knowledge sharing among team members, cultivating a collaborative work culture. The Potato Plant Disease Detection project has brought early disease detection to farmers, resulting in improved crop health and economic benefits.

Environmental Effects: By prioritizing digital solutions and software development, these projects align with environmentally conscious practices. They reduce the environmental impact typically associated with physical infrastructure and materials.

Resource Consumption: While these projects inherently reduce resource consumption through their digital focus, it's essential to consider resource implications as ADN Diginet scales AI solutions in the future. Increased computational resources may impact energy consumption and the carbon footprint, warranting responsible resource management.

8.3. Addressing Ethics and Ethical Issues in the EDU Chatbot and Potato Plant Disease Detection Projects

In both the EDU Chatbot and Potato Plant Disease Detection Projects, ethical considerations hold paramount significance. Data privacy and explicit user consent are foundational principles, particularly in the EDU Chatbot, where responsible data handling is pivotal.

Ensuring the safeguarding of user data and obtaining explicit consent for its usage are imperative ethical practices. Furthermore, in both projects, vigilance against biases in AI algorithms is a critical ethical obligation. The EDU Chatbot's recommendation system and the disease detection

model in the Potato Plant Disease Detection Project must undergo regular assessments and mitigation efforts to guarantee fairness and impartiality.

Transparency and accountability are intrinsic to ethical AI deployment, demanding that users comprehend how their data is employed and decisions are reached. Lastly, the implementation of a continuous ethical review process in both projects underscores a commitment to adapting to evolving ethical standards and regulations, ensuring the responsible and compliant deployment of AI technologies.

9. Chapter 9: Lesson Learned

Throughout my internship journey at ADN DIGINET, I have had the privilege of gaining a diverse and comprehensive set of skills that extend far beyond the realms of artificial intelligence (AI). From the technical intricacies of data collection, model selection, and hyperparameter tuning to the broader perspectives of ethical considerations and project sustainability, this internship has been a transformative learning experience.

In particular, my proficiency in API development and its seamless integration into frontend applications has been a noteworthy accomplishment. I have acquired the ability to construct robust APIs using Flask and FastAPI, which serve as the vital link between backend AI models and frontend interfaces. These skills have empowered me to create end-to-end solutions that prioritize user experience, ensuring that complex AI capabilities are accessible and user centric. This newfound expertise in bridging the gap between backend functionality and user interaction will undoubtedly serve as a cornerstone for my future endeavors, enhancing my adaptability and versatility as a software developer.

The lessons learned during this internship transcend technical knowledge; they encompass the cultivation of a culture of learning, innovation, and ethical responsibility. These insights have broadened my horizons and equipped me with the skills and mindset necessary to tackle the multifaceted challenges of the ever-evolving technological landscape. This internship has not only

enhanced my proficiency in AI but has also instilled in me a commitment to responsible and impactful AI development—a lesson that will continue to guide me in my future endeavors.

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Turnitin Score

An Undergraduate Internship/Project on Potato plant disease detection and Edu-Chatbot

By

Akib Raihan

Student ID: **2020367**

Summer, 2023

Consent from Supervisor

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